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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/813,892	03/31/2004	Peter N. Comley	38190/274036	5765

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EXAMINER	
BEVERIDGE, RACHEL E	
ART UNIT	**PAPER NUMBER**
1725	

DATE MAILED: 02/15/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/813,892	COMLEY ET AL.	
	Examiner	Art Unit	
	Rachel E. Beveridge	1725	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *31 March 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-35* is/are pending in the application.

4a) Of the above claim(s) *26-35* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☒ Claim(s) *1-35* are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *31 March 2004* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *3/31/04 & 4/21/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

Restriction to one of the following inventions is required under 35 U.S.C. 121:

I. Claim 1-14 and 16-25, drawn to a method for superplastically forming a blank, classified in class 72, subclass various.

II. Claims 26-35, drawn to a method for diffusion bonding first and second surfaces of at least one structural member, classified in class 228, subclass 193.

III. Claim 15, drawn to a superplastically formed structural memeber, classified in class 428, subclass various.

The inventions are distinct, each from the other because of the following reasons:

Inventions Group I and Group II are related as process of making and process of using the product. The use as claimed cannot be practiced with a materially different product. Since the product is not allowable, restriction is proper between said method of making and method of using. The product claim will be examined along with the elected invention (MPEP § 806.05(i)).

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

During a telephone conversation with Nicholas Gallo on December 5, 2005 a provisional election was made with traverse to prosecute the invention of Group I, claims 1-14 and 16-25. Affirmation of this election must be made by applicant in

replying to this Office action. Claims 26-35 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Information Disclosure Statement

The information disclosure statement filed April 21, 2004 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each cited foreign patent document; each non-patent literature publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but the information referred to therein has not been considered. However, the examiner considered all non-patent literature that was provided by the applicant. See the information disclosure statement for reference to the missing article.

The information disclosure statement filed March 31, 2004 fails to comply with 37 CFR 1.98(a)(1), which requires the following: (1) a list of all patents, publications, applications, or other information submitted for consideration by the Office; (2) U.S. patents and U.S. patent application publications listed in a section separately from citations of other documents; (3) the application number of the application in which the information disclosure statement is being submitted on each page of the list; (4) a

column that provides a blank space next to each document to be considered, for the examiner's initials; and (5) a heading that clearly indicates that the list is an information disclosure statement. The information disclosure statement has been placed in the application file, but the information referred to therein has not been considered. The following patents made reference to in the applicant's specification were not listed in the information disclosure statement on the filing date, March 31, 2004: US 3,927,817, US 4,361,262, US 5,214,948, US 5,683,607, US 6,612,020.

Drawings

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: Figures 6 and 7 are missing reference numbers referring to "lines 40, 42, 44, and 46" as disclosed on page 9, lines 18-19. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-4 and 10-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Weisert et al. (US 4,882,823) in view of Froes et al. (US 5,024,369).

With respect to claims 1-2 and 10-15, Weisert discloses an invention for diffusion bonding and superplastic forming hollow components such as aircraft engine components (i.e. gas turbine compressor fan blades) (Weisert, col. 1, lines 5-10). Weisert discloses superplastically forming "reactive" metals including titanium (Weisert, col. 3, lines 49-53) and further teaches a preferred material of Ti-6Al-4V superplastically formed at general temperature ranges including 1450°F-1750°F (Weisert, col. 4, lines 15-18). Weisert also teaches diffusion bonding the preferred Ti-6Al-4V material at 25-300 psi for about 30 minutes (Weisert, col. 4, lines 19 and 28). Furthermore, Weisert discloses flat surfaces (14,20) positioned in abutting relation to each other of to the opposite flat sides of the intermediate flat core sheet (24), and teaches subjecting the sheets (12,18,24) to diffusion bonding conditions in appropriate tooling (27) to bond the flat surfaces (14,20) to each other or to the core sheet (24) other than where the stop-off material was applied, thereby forming a diffusion bonded sandwich (29) (Weisert, col. 4, lines 56-64). See figure 2B. Weisert also discloses that superplastic behavior enhances formability under compressive strain conditions (Weisert, col. 3, lines 47-49).

Therefore, the properties and method of invention are so similar with that of the applicant's claimed invention it is necessarily present to arrive at the specified strain rates of claims 11 and 12. However, Weisert lacks disclosure of specific grain sizes for the titanium blank. Froes discloses the production of superplastically formed and diffusion bonded components requiring titanium alloy sheets and foils with uniform and fine grain structure (Froes, col. 2, lines 9-11). Froes also teaches Ti-6Al-4V as a suitable alloy for the disclosed process (Froes, col. 3, lines 55-58) and discloses an average grain size of about 2 to 20 microns (Froes, col. 4, lines 14-15). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the process of Weisert to include the grain size restraints of Froes in order to permit fabrication of airframe and engine structures with significant cost and weight reduction (Froes, col. 2, lines 6-8).

Regarding claims 3-4, Weisert lacks disclosure of specific grain sizes for the titanium blank. Froes discloses the production of superplastically formed and diffusion bonded components requiring titanium alloy sheets and foils with uniform and fine grain structure (Froes, col. 2, lines 9-11). Froes also teaches Ti-6Al-4V as a suitable alloy for the disclosed process (Froes, col. 3, lines 55-58) and discloses an average grain size of about 2 to 20 microns (Froes, col. 4, lines 14-15). Put another way, Froes teaches "about 2 microns" to be an art recognized result effective variable depending on the type of material to be used. It would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify the process of Weisert to include the grain size restraints of Froes in order to permit fabrication of airframe and engine

structures with significant cost and weight reduction (Froes, col. 2, lines 6-8). That is it would have been obvious to one of ordinary skill in the art at the time of the invention to choose the instantly claimed ranges through process optimization, since it has been held that there are general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. See In re Boesch, 205 USPQ 215 (CCPA 1980).

Claims 5-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Weisert et al. (US 4,882,823) and Froes et al. (US 5,024,369) as applied to claim 1 above, and further in view of Stacher (US 5,118,026).

Weisert and Froes lack disclosure of pickling the surface of the workpiece to remove any formed oxide during the superplastic forming step. Stacher discloses the fabrication of titanium aluminide sandwich structures that combines the process of metal joining and superplastic forming (Stacher, col. 3, lines 26-29). Stacher states that titanium is particularly sensitive to oxygen, nitrogen, and water vapor content in the air at elevated temperatures (Stacher, col. 2, lines 33-35). Stacher further teaches that the surfaces require preparatory cleaning (i.e. pickling) (Stacher, col. 2, lines 45-47) and states that further application of pressure breaks up the surface oxides to present clean surfaces for bonding (Stacher, col. 2, lines 53-55). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the combined invention of Weisert and Froes to include the pickling step of Stacher in order to significantly lower the cost, difficulty, and time involved in diffusion bonding and superplastic forming titanium alloy structures (Stacher, col. 3, lines 30-36).

Claims 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Weisert et al. (US 4,882,823) and Froes et al. (US 5,024,369) as applied to claim 6 above, and further in view of Stacher (US 5,118,026).

With regard to claim 7, Stacher teaches that the surfaces require preparatory cleaning (i.e. pickling) (Stacher, col. 2, lines 45-47) and states that further application of pressure breaks up the surface oxides to present clean surfaces for bonding (Stacher, col. 2, lines 53-55). Furthermore, Weisert's invention includes the same properties and method of the claimed invention. Thus, with the combined invention of Weisert, Froes, and Stacher it is obvious to arrive at the claimed pickling rate. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the combined invention of Weisert and Froes to include the pickling step of Stacher in order to significantly lower the cost, difficulty, and time involved in diffusion bonding and superplastic forming titanium alloy structures (Stacher, col. 3, lines 30-36).

Regarding claim 8, Stacher teaches that the surfaces require preparatory cleaning (i.e. pickling) (Stacher, col. 2, lines 45-47) and states that further application of pressure breaks up the surface oxides to present clean surfaces for bonding (Stacher, col. 2, lines 53-55). Furthermore, Weisert's invention includes the same properties and method of the claimed invention. Thus, with the combined invention of Weisert, Froes, and Stacher it is obvious to arrive at the claimed amount of oxide to be removed from the surfaces. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the combined invention of Weisert and Froes to include the

pickling step of Stacher in order to remove an accurate amount of oxide to obtain the maximum obtainable joint strength (Stacher, col. 2, lines 50-53).

With respect to claim 9, Stacher teaches that the surfaces require preparatory cleaning (i.e. pickling) (Stacher, col. 2, lines 45-47) and states that further application of pressure breaks up the surface oxides to present clean surfaces for bonding (Stacher, col. 2, lines 53-55). Weisert also discloses the average thickness of the diffusion bonded sandwich between 5 mils (thousands of an inch) and about 150 mils (Weisert, col. 5, lines 6-10). Furthermore, Weisert's invention includes the same properties and method of the claimed invention. Thus, with the combined invention of Weisert, Froes, and Stacher it is obvious to arrive at the claimed thickness. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the combined invention of Weisert and Froes to include the pickling step of Stacher in order to significantly lower the cost, difficulty, and time involved in diffusion bonding and superplastic forming titanium alloy structures (Stacher, col. 3, lines 30-36), and further to modify the combined invention of Weisert, Froes, and Stacher to include the thickness of Weisert in order to obtain a uniform mass distribution (thickness) of the sheets and therefore prevent rupturing of the truss core during superplastic forming (Weisert, col. 5, lines 16-19).

Claims 16-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Weisert et al. (US 4,882,823) in view of Froes et al. (US 5,024,369) and Stacher (US 5,118,026).

With respect to claims 16-19 and 21-25, Weisert discloses an invention for diffusion bonding and superplastic forming hollow components such as aircraft engine components (i.e. gas turbine compressor fan blades) (Weisert, col. 1, lines 5-10). Weisert discloses superplastically forming "reactive" metals including titanium (Weisert, col. 3, lines 49-53) and further teaches a preferred material of Ti-6Al-4V superplastically formed at general temperature ranges including 1450°F-1750°F (Weisert, col. 4, lines 15-18). Weisert also teaches diffusion bonding the preferred Ti-6Al-4V material at 25-300 psi for about 30 minutes (Weisert, col. 4, lines 19 and 28). Furthermore, Weisert discloses flat surfaces (14,20) positioned in abutting relation to each other of to the opposite flat sides of the intermediate flat core sheet (24), and teaches subjecting the sheets (12,18,24) to diffusion bonding conditions in appropriate tooling (27) to bond the flat surfaces (14,20) to each other or to the core sheet (24) other than where the stop-off material was applied, thereby forming a diffusion bonded sandwich (29) (Weisert, col. 4, lines 56-64). See figure 2B. Weisert also discloses that superplastic behavior enhances formability under compressive strain conditions (Weisert, col. 3, lines 47-49). Therefore, the properties and method of invention are so similar with that of the applicant's claimed invention it is necessarily present to arrive at the specified strain rates of claims 22 and 23 and the specified "about 1425°F" of claim 21. However, Weisert lacks disclosure of specific grain sizes for the titanium blank. Froes discloses the production of superplastically formed and diffusion bonded components requiring titanium alloy sheets and foils with uniform and fine grain structure (Froes, col. 2, lines 9-11). Froes also teaches Ti-6Al-4V as a suitable alloy for the disclosed process

(Froes, col. 3, lines 55-58) and discloses an average grain size of about 2 to 20 microns (Froes, col. 4, lines 14-15). The combined invention of Weisert and Froes does not disclose pickling the surface of the workpiece to remove any formed oxide during the superplastic forming step. Stacher discloses the fabrication of titanium aluminide sandwich structures that combines the process of metal joining and superplastic forming (Stacher, col. 3, lines 26-29). Stacher states that titanium is particularly sensitive to oxygen, nitrogen, and water vapor content in the air at elevated temperatures (Stacher, col. 2, lines 33-35). Stacher further teaches that the surfaces require preparatory cleaning (i.e. pickling) (Stacher, col. 2, lines 45-47) and states that further application of pressure breaks up the surface oxides to present clean surfaces for bonding (Stacher, col. 2, lines 53-55). Furthermore, Weisert's invention includes the same properties and method of the claimed invention. Thus, with the combined invention of Weisert, Froes, and Stacher it is obvious to arrive at the claimed pickling rate. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the combined invention of Weisert and Froes to include the pickling step of Stacher in order to significantly lower the cost, difficulty, and time involved in diffusion bonding and superplastic forming titanium alloy structures (Stacher, col. 3, lines 30-36). Froes teaches "about 2 microns" to be an art recognized result effective variable depending on the type of material to be used. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the process of Weisert to include the grain size restraints of Froes in order to permit fabrication of airframe and engine structures with significant cost and weight reduction (Froes, col. 2, lines 6-8). That is it

would have been obvious to one of ordinary skill in the art at the time of the invention to choose the instantly claimed ranges through process optimization, since it has been held that there are general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art, see In re Boesch, 205 USPQ 215 (CCPA 1980); and further, to modify the combined invention of Weisert and Froes to include the pickling step of Stacher in order to remove an accurate amount of oxide to obtain the maximum obtainable joint strength (Stacher, col. 2, lines 50-53) and to significantly lower the cost, difficulty, and time involved in diffusion bonding and superplastic forming titanium alloy structures (Stacher, col. 3, lines 30-36).

With respect to claim 20, Stacher teaches that the surfaces require preparatory cleaning (i.e. pickling) (Stacher, col. 2, lines 45-47) and states that further application of pressure breaks up the surface oxides to present clean surfaces for bonding (Stacher, col. 2, lines 53-55). Weisert also discloses the average thickness of the diffusion bonded sandwich between 5 mils (thousands of an inch) and about 150 mils (Weisert, col. 5, lines 6-10). Furthermore, Weisert's invention includes the same properties and method of the claimed invention. Thus, with the combined invention of Weisert, Froes, and Stacher it is obvious to arrive at the claimed thickness. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the combined invention of Weisert and Froes to include the pickling step of Stacher in order to significantly lower the cost, difficulty, and time involved in diffusion bonding and superplastic forming titanium alloy structures (Stacher, col. 3, lines 30-36), and further to modify the combined invention of Weisert, Froes, and Stacher to include the

thickness of Weisert in order to obtain a uniform mass distribution (thickness) of the sheets and therefore prevent rupturing of the truss core during superplastic forming (Weisert, col. 5, lines 16-19).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rachel E. Beveridge whose telephone number is 571-272-5169. The examiner can normally be reached on Monday through Friday, 9 am to 6 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

reb

JONATHAN JOHNSON
PRIMARY EXAMINER